

We claim:

1. A polishing pad comprising a hydrophilic polishing layer with a polishing surface, the polishing layer comprising a polishing material having:

- i. a density greater than 0.5 g/cm^3 ;
- ii. a critical surface tension greater than or equal to 34 milliNewtons per meter;
- iii. a tensile modulus of 0.02 to 5 GigaPascals;
- iv. a ratio of tensile modulus at 30°C to tensile modulus at 60°C of 1.0 to 2.5;
- v. a hardness of 25 to 80 Shore D;
- vi. a yield stress of 300-6000 psi;
- vii. a tensile strength of 1000 to 15,000 psi; and
- viii. an elongation to break less than or equal to 500%;

the polishing material being useful for chemical mechanical polishing for the manufacture of semiconductor substrates comprising a polymer pad material selected from the group comprising urethane, carbonate, amide, sulfone, vinyl chloride, acrylate, methacrylate, vinyl alcohol, ester and acrylamide; wherein the polishing layer is porous and the polishing surface is formed by a process selected from the group consisting of molding, embossing, printing, casting, sintering, photo-imaging, chemical etching and solidifying.

2. The polishing pad in accordance with Claim 1 wherein the polishing surface has a micro-texture of indentations or micro-asperities of which an average depth is in the range of less than 50 microns.

3. A polishing pad in accordance with Claim 1 wherein the polymer includes urethane.

4. A polishing pad comprising a hydrophilic polishing layer with a polishing surface, the polishing layer comprising a polishing material having:

- i. a density greater than 0.5 g/cm^3 ;

- ii. a critical surface tension greater than or equal to 34 milliNewtons per meter;
- iii. a tensile modulus of 0.02 to 5 GigaPascals;
- iv. a ratio of tensile modulus at 30°C to tensile modulus at 60° C of 1.0 to 2.5;
- v. a hardness of 25 to 80 Shore D;
- 5 vi. a yield stress of 300-6000 psi;
- vii. a tensile strength of 1000 to 15,000 psi; and
- viii. an elongation to break less than or equal to 500%;

10 the polishing material being useful for chemical mechanical polishing for the manufacture of semiconductor substrates comprising a polymer pad material selected from the group comprising urethane, carbonate, amide, sulfone, vinyl chloride, acrylate, methacrylate, vinyl alcohol, ester and acrylamide; wherein the polishing layer is porous and the polishing surface is formed by molding.

15 5. The polishing pad in accordance with Claim 4 wherein the polishing surface has a micro-texture of indentations or micro-asperities of which an average depth is in the range of less than 50 microns.

20 6. A polishing pad in accordance with Claim 4 wherein the polymer includes urethane.

7. A method of manufacturing a polishing pad comprising a hydrophilic polishing layer with a polishing surface, the polishing layer comprising a polishing material having:

- i. a density greater than 0.5 g/cm³;
- ii. a critical surface tension greater than or equal to 34 milliNewtons per meter;
- 25 iii. a tensile modulus of 0.02 to 5 GigaPascals;
- iv. a ratio of tensile modulus at 30°C to tensile modulus at 60° C of 1.0 to 2.5;
- v. a hardness of 25 to 80 Shore D;
- vi. a yield stress of 300-6000 psi;
- vii. a tensile strength of 1000 to 15,000 psi; and
- 30 viii. an elongation to break less than or equal to 500%;

the polishing material being useful for chemical mechanical polishing for the manufacture of semiconductor substrates comprising a polymer pad material selected from the group comprising urethane, carbonate, amide, sulfone, vinyl chloride, acrylate, methacrylate, vinyl alcohol, ester and acrylamide; comprising molding the polishing surface, the polishing layer
5 being porous; and forming the polishing surface without cutting or skiving parallel to the polishing surface.

8. The method of claim 7 wherein the polishing layer includes polyurethane and including the additional step of applying an organic material a mold surface prior to molding of the
10 polishing surface.

9. The method of claim 7 wherein the molding is a net-shape process for manufacturing the polishing pad.

15 10. The method of claim 7 including the additional step of conditioning the polishing surface with an abrasive surface.

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